

WHAT IS CLAIMED IS:

1. A respiratory monitoring system, comprising:

a plurality of sensors that produces weight signals corresponding to forces applied by a person under respiratory monitoring during sleep;

a respiratory signal producing means that produces a respiratory signal representing respiratory conditions of the person based on the weight signals; and

a sensor selecting means that selects sensors have output signals higher than a predetermined level from all sensors, wherein

the respiratory signal producing means produces the respiratory signal based on the weight signals outputted from the sensors that are selected by the sensor selecting means; and

the sensor selecting means further selects the sensors have output signals related to a respiratory body movement of the person from the selected sensors based on a comparison of signal levels between a respiration frequency band corresponding to the respiratory body movement and another frequency band.

2. The respiratory monitoring system according to claim 1, wherein the sensors are arranged under, inside, or on a sleep pad around an area in which a torso of the person lies.

3. The respiratory monitoring system according to claim 1,

wherein the sensor selecting means selects the sensors based on a comparison of the respiratory signal levels between the respiration frequency band and a frequency band higher than the respiration frequency band.

4. The respiratory monitoring system according to claim 3, wherein the sensor selecting means selects the sensors having an average of the signal levels in the respiration frequency band is a predetermined times higher than that in the frequency band higher than the respiration frequency band.

5. The respiratory monitoring system according to claim 1, wherein the sensor selecting means selects the sensors based on a comparison of the respiratory signal levels between the respiration frequency band and a frequency band lower than the respiration frequency band.

6. The respiratory monitoring system according to claim 5, wherein the sensor selecting means selects the sensors having an average of the signal levels in the respiration frequency band is a predetermined times higher than that in the frequency band lower than the respiration frequency band.

7. The respiratory monitoring system according to claim 1, further includes a bias component removing means, wherein the bias component removing means removes a bias component from the weight signals prior to selecting the sensors by the

sensor selecting means.

8. The respiratory monitoring system according to claim 1, further comprising a sensor detecting means that detects a sensor under the person.

9. The respiratory monitoring system according to claim 1, wherein the respiratory signal producing means reproduces a respiratory signal based on weight signals newly outputted from the sensors when an amplitude of the respiratory signal is lower than a predetermined level for a predetermined period.

10. The respiratory monitoring system according to claim 1, further comprising a warning means that sends a warning signal with synchronization with the respiratory signal.

11. A respiratory monitoring system for a sleep apnea syndrome examination comprising:

a respiratory signal producing means that produces a respiratory signal representing a variation in weight applied due to a respiratory body movement of a person under the sleep apnea syndrome examination;

a determination means that detects apnea or hypopnea of the person based on a variation in frequency of the respiratory signal.

12. The respiratory monitoring system according to claim 11,

wherein:

the determination means monitors a variation in amplitude of the respiratory signal;

the determination means detects apnea or hypopnea when the amplitude of the respiratory signal decrease, increase, and then decrease with time and a frequency of the respiratory signal increases as the amplitude of the same increases.

13. The respiratory monitoring system according to claim 12, wherein:

the determination means calculates an amplitude average from a plurality of respiratory signals;

the determination means detects the variation in amplitude based on the calculation.

14. The respiratory monitoring system according to claim 12, wherein the determination means determines that the amplitude of the respiratory signal varies from a decreasing state to an increasing state when a variation rate of the respiratory signal is equal to or more than 1.4.

15. The respiratory monitoring system according to claim 11, wherein the determination means that the frequency of the respiratory signal varies from low to high when a period of the respiratory signal becomes 0.5 second shorter than the previous signal.

16. The respiratory monitoring system according to claim 12, wherein the determination means determines that a respiratory condition of the person is normal when a condition that the amplitude increases and the frequency is high continues less than a predetermined period.

17. The respiratory monitoring system according to claim 11, further comprising a calculation means that calculates a number of times of the apnea or the hypopnea detected by the determination means.

18. The respiratory monitoring system according to claim 1, further comprising a distinguish means that distinguishes between the apnea and the hypopnea based on a phase difference in weight signals according to a respiratory body movement in a chest area and an abdominal area.

19. The respiratory monitoring system according to claim 18, wherein the distinguishing means determines the hypopnea when the weight signals are substantially in phase and the apnea when the weight signals are substantially in opposite phase.

20. The respiratory monitoring system according to claim 11, further comprising a sleeping posture determination means that determines a sleeping posture of the person during sleep based on a weight distribution of the sensors.

21. The respiratory monitoring system according to claim 20, wherein the calculation means calculates the number of times that the apnea or the hypopnea is detected for each sleeping posture determined by the sleeping posture determination means.

22. The respiratory monitoring system according to claim 11, wherein the respiratory signal producing means stops producing the respiratory signals while the weight distribution is changing.

23. The respiratory monitoring system according to claim 11, further comprising a person presence detecting means that detects a presence or an absence of the person based on a weight applied by an object on the sensors, wherein

the respiratory signal producing means stops producing the respiratory signals when the person presence detecting means detects the absence of the person.

24. The respiratory monitoring system according to claim 23, wherein the person presence detecting means detects the absence of the person when an area in which the sensors that receive the weight is smaller than a predetermined area.

25. The respiratory monitoring system according to claim 23, wherein the person presence detecting means detects the absence of the person when the variation in weight due to the respiratory body movement is absent.

26. The respiratory monitoring system according to claim 17, further includes a memory device for storing at least one of the respiratory signals, the result of the determination by the determination means, and the result of the calculation by the calculation means.

27. The respiratory monitoring system according to claim 26, wherein the memory device further stores results of the determination by the distinguishing means, by the sleeping posture determination means, and by the person presence detection means.

28. The respiratory monitoring system according to claim 26, further comprising an output means that outputs information stored in the memory device.